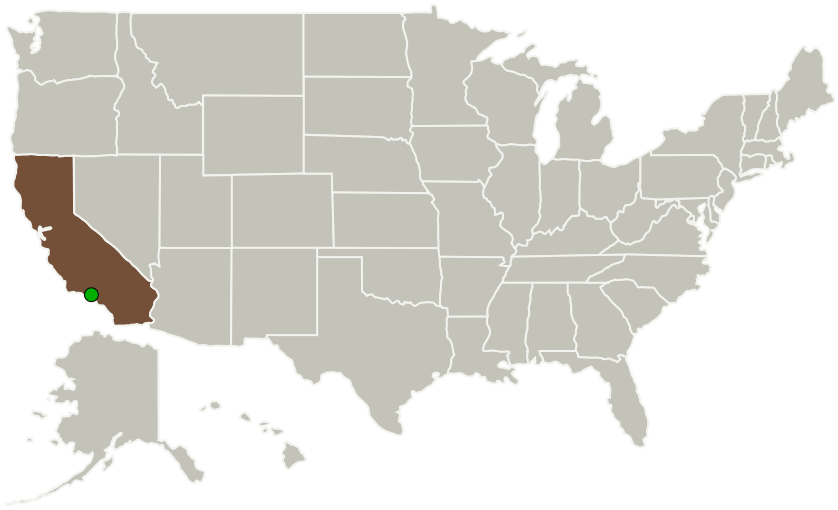
Innovative X-ray Star Scanner for Spin Stabilized Microsatellites, Phase I

Completed Technology Project (2011 - 2011)

Project Introduction

Recent advances in the design of microsatellites have led to renewed interest in the missions that can be flown with small spacecraft and small payloads. The CubeSat platform and the Plug-and-Play concept have prompted the development of attitude determination hardware typical of larger, more sophisticated, three axis stabilized spacecraft, including miniature gyroscopes and star cameras. The X-ray Star Scanner is a new class of attitude sensor, designed to support precision spin-stabilized CubeSat missions by providing arcminute attitude accuracy in a size compatible with a CubeSat, in fact occupying less than half of a 1U CubeSat module. The scientific and technological advances necessary to make this instrument possible are in place. A robust catalog of x-ray guide stars is available through several all-sky surveys performed in x-rays. Solid state x-ray detectors and their related support electronics have been flown. The concept of using guide stars to determine the attitude of a spinning vehicle has been demonstrated using flight data. The XSS fills the need created by the CubeSat and Plug-and-Play platforms for accurate attitude determination on a spin stabilized platform provided in a small package.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
CrossTrac Engineering, Inc.	Lead Organization	Industry	Mountain View, California
Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations
California

Project Transitions

February 2011: Project Start

September 2011: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138660)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

CrossTrac Engineering, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

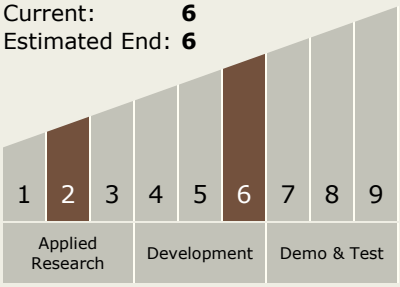
Carlos Torrez

Principal Investigator:

John Hanson

Technology Maturity (TRL)

Start: **2**
Current: **6**
Estimated End: **6**



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Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - TX05.4 Network Provided Position, Navigation, and Timing
    - TX05.4.2 Revolutionary Position, Navigation, and Timing Technologies

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System